ModelSim® SE Installation and Licensing Guide

Software Version 10.2c

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Chapter 1
Installation and Licensing

Upgrading to a New Release

When you upgrade to ModelSim v10.2c from v10.1x (or earlier), you will need to regenerate your design libraries after installing the software. For more information, refer to the section Regenerating Your Design Libraries.

Release 10.2c of ModelSim uses version v11.10 of FlexNet. Sites that have existing license servers running an older version must shut down the servers and restart them using the license server (lmgrd) and vendor daemon (mgcld) provided in this release.

Supported Platforms

Table 1-1. Supported Platforms

Platform	OS	Binary	VCO name[1]	Memory capacity
EM64T	• SUSE Linux Enterprise Server 10, 11 • Red Hat Enterprise Linux 4, 5, 6	32-bit	linux	3GB[2]
		64-bit	linux_x86_64	terabytes
x86	• Windows XP, Vista (32-bit only)	32-bit	win32	2GB 3GB[3]
	• Windows 7 (32-bit)	32-bit	win32[4]	2GB
	• Windows 7 (64-bit)	64-bit	win64	terabytes
	• Red Hat Enterprise Linux 4, 5, 6	32-bit	linux	3GB[2]
AMD64	• SUSE Linux Enterprise Server 10, 11 • Red Hat Enterprise Linux 4, 5, 6	32-bit	linux	3GB[2]
		64-bit	linux_x86_64	terabytes

1. The VCO name refers to the platform directories that are created during installation.
2. Memory usage is limited to the maximum process size allowed by the Linux kernel.
3. The product is now /LARGEADDRESSAWARE by default. This applies to Windows configurations that include the /3GB or /userva boot switches for XP and Vista, respectively.
4. ModelSim 32-bit (win32) installs and runs on Windows 7 64-bit OS, though it only runs as a 32-bit binary.

SystemC Supported Platforms

SystemC runs on a subset of supported platforms, as shown in Table 1-2. Refer to *SystemC Simulation* in the User's Manual for more details.

Table 1-2. Supported Platforms for SystemC

Platform/OS	Supported compiler versions	32-bit support	64-bit support
Intel and AMD x86-based architectures (32- and 64-bit) SUSE Linux Enterprise Server 10, 11 Red Hat Enterprise Linux 4, 5, 6	gcc 4.3.3 and 4.5.0 VCO is linux (32-bit binary) VCO is linux_x86_64 (64-bit binary)	yes	yes
Windows[1] XP, Vista and 7	Minimalist GNU for Windows (MinGW) gcc 4.2.1— VCO is win32	yes	no

1. 32-bit executable and 32-bit gcc can be used with 64-bit Windows systems, though they only run as 32-bit binaries.

Note

ModelSim SystemC has been tested with the gcc versions provided in the install tree. It is strongly recommended to use the gcc version that came with your installation—customized versions of gcc may cause problems.

For the Windows platform, you must install the compilers manually. The following steps describe how to obtain and install your required compiler.

1. Install the product.

   This installs the base product and the documentation.

2. Navigate to the following site.

   ```
   www.mentor.com/supportnet
   ```

3. Locate the appropriate MinGW .zip file:

   - `modelsim_gcc-4.2.1-mingw32vc9.zip`

4. Extract the contents of the .zip file to the top level of your install directory.

Operating System-Specific Information

This section provides information specific to the various supported platforms.

Windows Operating Systems

The following section provides information specific to the supported Windows operating systems.

Creating .dll or .exe Files using Compiled .lib files

This section describes information you require to create .dll or .exe files using .lib files supplied with ModelSim. These scenarios typically involve DPI, VPI, PLI, FLI, or the UCDB API.

To create a .dll or .exe file using ModelSim .lib files found in the *<install_dir>/win32* directory you must be aware of the following:

- You must be using Microsoft Visual Studio 2008[1] (sometimes referred to as VC 9.0) to create your .dll or .exe files. You cannot use any earlier versions of Visual Studio because our .lib files were compiled using Visual Studio 2008.
  - Install Visual Studio 2008 on the machine from which you create your .dll and .exe files rather than working from a remote server. This is due to the requirements of Visual Studio 2008.
  - Ensure your environment is correctly pointing to Visual Studio 2008 by running a compile command and analyzing the output.
- Review the examples we've created and placed in the *<install_dir>/examples/c_windows/ucdb_static* directory for information on compiling and linking .lib files into a .dll or .exe using Visual Studio 2008. The examples include use models using the Microsoft DOS shell, Cygwin bash shell, and the make utility.
- Alter your existing compile and linking commands to work with Visual Studio 2008. Paying special attention to any hard coded paths that may refer to previous versions of Visual Studio.
  - Review the Visual Studio 2008 documentation for more information.
  - Simple compile and linking commands should transfer to Visual Studio 2008.
- Gain an understanding of manifest files, which were introduced with Visual Studio 2008.
  - Each time you build a .dll or .exe, Visual Studio 2008 creates a manifest file. The manifest file describes the dependencies that a .dll or .exe has. You must always store the manifest file in the same directory as the .dll or .exe file. If the manifest is not located with the .dll or .exe files, they will not load properly.
  - Alternatively you can use the Microsoft mt.exe command to embed the manifest file with the .dll or.exe file. Review the documentation for mt.exe for more information.

1. You can use either Visual Studio 2008 Professional or Express.

- The included examples make use of the mt.exe command.

- Notify anyone receiving your .dll or .exe file that they must install the Microsoft Visual C++ 2008 Redistributable Package, available from Microsoft's support site:

  http://www.microsoft.com/downloads/

The following is an example of the commands you could use. You can find a complete .bat version of this example in the *<install_dir>/examples/c_windows/ucdb* directory:

```
cl.exe /c /DWIN32 /DNTDDI_VERSION=NTDDI_WINXP /DWIN32_LEAN_AND_MEAN /Z7 /Od
/MD /I%MTI_HOME%\include /I"%TOOLPATH%\include" ..\src\ucdbdump.c

link.exe /INCREMENTAL:NO /DEBUG /subsystem:console /OUT:ucdbdump.exe
ucdbdump.obj %MTI_HOME%\win32\ucdb.lib /LIBPATH:"%TOOLPATH%\lib"
/LIBPATH:"%SDKPATH%\lib"

mt.exe /manifest ucdbdump.exe.manifest /outputresource:ucdbdump.exe
```

Compiling Executables Using gcc v4.2.1 on Windows PC

With the introduction of gcc-4.2.1-mingw32vc9 a change was made to the installation specs file such that the default Windows C-runtime library cannot be accessed. Use the following procedure to link your C programs to the msvcr90.dll C-runtime library.

1. Create a *test.rc* file

   Filename: *test.rc*

   ```
   #include <windows.h>
        /*
         * 1 - executable, 2 - dll
         * RT_MANIFEST
         * test.exe.manifest
         */
        1 RT_MANIFEST test.exe.manifest
   ```

   Filename: *test.exe.manifest*

   ```
   <?xml version='1.0' encoding='UTF-8' standalone='yes'?>
   <assembly xmlns='urn:schemas-microsoft-com:asm.v1'
   manifestVersion='1.0'>
     <trustInfo xmlns="urn:schemas-microsoft-com:asm.v3">
       <security>
         <requestedPrivileges>
           <requestedExecutionLevel level='asInvoker' uiAccess='false'
   />
         </requestedPrivileges>
       </security>
     </trustInfo>
     <dependency>
       <dependentAssembly>
         <assemblyIdentity type='win32' name='Microsoft.VC90.CRT'
   version='9.0.21022.8' processorArchitecture='amd64'
   publicKeyToken='1fc8b3b9a1e18e3b' />
   ```

```
      </dependentAssembly>
    </dependency>
  </assembly>
```

2. Create a *test.res* file from the *test.rc* file using the **windres** program (located in your */c/MingW/bin* directory)

```
shell> windres --input test.rc --output test.res --output-format=coff
```

3. Link the *test.res* file to *test.exe*

```
gcc.exe -o test.exe test.o test.res
```

Discontinued and Retiring Operating Systems

The following is a list of discontinued operating systems and their last-supported ModelSim release. Technical support will answer questions regarding discontinued operating systems, but no patches are available subsequent to the last supported ModelSim release.

Also, please be aware of the operating systems that Mentor Graphics has scheduled to retire. Retiring operating systems will receive patches through the number release indicated.

Table 1-3. Discontinued and Retiring Operating Systems

Operating System	Status	Last supported ModelSim release
Windows 98, ME, and NT 4.0	discontinued	6.1x
Solaris 2.6 and 2.7	discontinued	6.1x
AIX 4.3	discontinued	6.1x
HP 700	discontinued	6.2x
HP-UX 11.0, 11i	discontinued	6.2x
RS6000 / AIX 5.1, 5.2	discontinued	6.2x
RedHat Linux 7.2, 7.3, and 8.0	discontinued	6.3x
RedHat Linux Advanced Workstation 2.1	discontinued	6.3x
RedHat Linux Enterprise version 2.1	discontinued	6.3x
Windows 2000	discontinued	6.4x
Itanium 2 / Red Hat Enterprise Linux 5	discontinued	6.4x
Solaris 8 and 9	discontinued	6.6x
Solaris 10 x86 and UltraSPARC	discontinued	10.0x
RedHat Linux Enterprise version 3	discontinued	10.1x
SUSE Linux Enterprise Server (SLES) 9	discontinued	10.1x

Licensing

ModelSim uses FlexNet licenses which are tied to a workstation or hardware ID (see below for how to locate your ID).

The following is an abbreviated example of a license file:

```
SERVER server1 117234f39g1m 1650
DAEMON mgcld <install_dir>/win32/mgcld
INCREMENT qhsimvh mgcld 2007.220 4-dec-2007 1 DD35265192B8C3224364
VENDOR_STRING=66E0B055 SN=6264745
SIGN2="1688 0801 FAEC 27CE A6AD 0C2D F9DB C37D 1E9C 7B5A F483 67BE 4F11
2C0C B7FC 135B 50AE 6C20 BE1E A991 2BCC 51BB 756D E2D5 CFB7 C801 FCE7 68F4
A24A A499"
INCREMENT qhsimvlog mgcld 2007.220 4-dec-2007 1 8D05E6017C8E0DE044AB
VENDOR_STRING=1AF05984 SN=6264744
SIGN2="071F 2C8E F935 C771 9C0A 763A CE62 9424 9B00 6810 7C5A E8C5 3BD3
0DF7 9E04 1511 233E 9A52 B8B0 FD65 CFCB 8B30 1384 CF3D 8323 444F 51F0 F6EE
177B 79DC"
```

The installation instructions on subsequent pages tell you how to install the license file. Keep in mind that you should modify the license file only as directed in these instructions. Make sure you do not inadvertently add spaces or line breaks to the file; this may prevent ModelSim from running.

Licensing on Windows Platforms

Note

The Windows directions refer to the Start button. If you are using Windows Vista or Windows 7, you should use the Windows logo in place of the Start button.

On Windows platforms the hardware identifier may be either a hardware security key or an Ethernet ID. To determine a security key ID number, check the number printed on the key. To determine the Ethernet ID, select **Start > Run** then Open "cmd" to open a command prompt. At the command prompt type:

```
ipconfig -all | more
```

Check the configuration listing for your Ethernet "Physical Address".

Licensing on UNIX Platforms

On UNIX platforms you'll need your workstation ID to obtain a license. Here are the commands that return the ID:

Table 1-4. Determining UNIX Workstation ID

Platform	Syntax	Notes
Linux	/sbin/ifconfig eth0	Look for the line that reads something like this: "Ethernet HWaddr 00:00:00:00:00:00." Remove the colons and you have the required 12-digit ID.
SPARC	hostid	SPARC

Mentor Graphics Licensing on UNIX Platforms

To use this version of ModelSim in a Mentor Graphics environment, you must be running Mentor Graphics Standard Licensing MSL v2012_2patch1 with MGLS v9.7_2.3 and PCLS v9.7.2.4 (or newer) and Packaging Information version v3.1_0.2a (or newer).

To check your current versions, do the following:

1. Make sure the MGLS_HOME environment variable is set to:

   ```
   <install directory>/<platform>/mgls
   ```

2. Execute $MGLS_HOME/bin/mgls_admin -v

If you are running a license server with an earlier version, you need to shut down the license server and restart it using the license server (lmgrd) and vendor daemon (mgcld) found in MGLS. Platform-specific MGLS is included in the ModelSim installation at:

```
<install directory>/<platform>/mgls
```

In ModelSim, the MGLS_HOME environment variable is set in a non-persistent way inside the simulation environment. If MGLS_HOME is already set, it will be changed temporarily to point at the known good mgls tree while ModelSim is invoked. The persistent setting of MGLS_HOME will not be changed.

The mgcld daemon is automatically installed into the binary directory when you install ModelSim.

Installation

Note

The instructions for Windows refer to the Start button. If you are using Windows Vista or Windows 7, you should use the Windows logo in place of the Start button.

The commands for installing ModelSim are case-sensitive, so you must enter them exactly as shown. If you are upgrading from a previous release, it is recommended that you install your upgrade in its own directory to avoid overwriting your old files and libraries.

License-Specific Instructions

The following sections describe how to install ModelSim, depending on the license specific to your operating system environment or platform:

- Floating License on a Stand-Alone Windows PC
- Windows PC Client (Obtains License from a Server)
- Windows PC License Server
- Stand-Alone UNIX Workstation
- UNIX Client (Obtains License From a Server)
- UNIX License Server

Windows Installation Instructions

ModelSim uses Mentor Graphics Install for installation on Windows machines. When installing multiple Windows products, use separate folders for each product. Installing multiple Windows products into the same folder will cause problems uninstalling the product. The main product executable is named:

```
modelsim_win32-<ver>.exe (win32), modelsim_win64-<ver>.exe (win64)
```

and the gcc compiler is named:

```
modelsim_gcc-4.2.1-mingw32vc9.zip (win32), modelsim_gcc-4.5.0-mingw64.zip
(win64)
```

Floating License on a Stand-Alone Windows PC

Use this setup if you are installing on a stand-alone Windows PC with a floating license. When stand-alone PCs use a floating license, ModelSim and the license server run on the same system.

1. If you received a hardware security key (dongle), install it on the parallel or USB port of your PC. Skip this step if you licensed ModelSim to the PC's Ethernet ID.
2. Install ModelSim from the CD or via a downloaded installation executable.
3. Once the software is done installing, you will be prompted to install a hardware security key driver. Choose **Yes** if you installed a security key in step 1; choose **No** if you licensed ModelSim to the PC's Ethernet ID.
4. After installation is complete, save the *license.dat* file to *<install_dir>\win32\license.dat*.

   Make sure there are no extra spaces or line breaks in the license file. It must exactly match the license you received by e-mail, including upper and lower case and any backslashes (\).
5. Verify the name of your PC via the Windows Control Panel by **System > Computer Name**.
6. Open the *license.dat* file and change the server name to the name of your PC. Use a text editor like Notepad rather than a word processor. Word processors may add extra hidden formatting characters to the file and cause problems. Edit the DAEMON line to point to the full path for the mgcld.exe, for example:

   ```
   SERVER server1 123456789123 1717
   DAEMON mgcld C:\<install_dir>\win32\mgcld.exe
   ```
7. Set the LM_LICENSE_FILE environment variable with the port# and hostname:
   - For Windows XP, right-click the My Computer icon and select Properties, then select the Advanced tab and then Environment Variables.

     For Windows Vista or 7, right-click the Computer icon and select Properties, then select Advanced System settings and then select Environment Variables.

     Add LM_LICENSE_FILE with a value of 1650@hostname, where hostname is the name of your PC.

     The software does not look for licensing variables in the registry, therefore you must set either LM_LICENSE_FILE or MGLS_LICENSE_FILE environment variable.
8. Reboot your PC.
9. Launch *lmtools.exe* from the *<install_dir>\win32* directory.
10. Choose the Config Services tab and add the pathnames for *lmgrd.exe*, *license.dat*, and *debug.log*. Typical entries might look like this:

    ```
    lmgrd.exe -- <install_dir>\win32\lmgrd.exe
    License file -- <install_dir>\win32\license.dat
    Debug log file -- <install_dir>\win32\debug.log
    ```

    Click **Save Setup** when you finish entering the pathnames.

11. Choose the Start/Stop/Reread tab and click **Start Server**.
12. To verify that the server started, choose the Config Services tab and click **View Log**. Look for two lines similar to the following:

```
14:31:00 (lmgrd) Starting vendor daemons ...
14:31:00 (lmgrd) Started mgcld (pid 1088)
```

    Close lmtools once the server is started.
13. Invoke ModelSim through the Windows Start menu.

Windows PC Client (Obtains License from a Server)

Use this setup if you are installing on a Windows PC that will obtain a license from a Windows PC or UNIX license server.

1. Install ModelSim from the CD or via a downloaded installation executable.
2. Once the software is done installing, you will be prompted to install a hardware security key driver. Choose **No** since you are obtaining the license from a server.
3. Once installation is complete, check with your system administrator for the license server's hostname (the network machine name) and port# (1650 is the default port number).
4. Set the LM_LICENSE_FILE environment variable with the port# and hostname given you by the system administrator.
    - For Windows XP, right-click the My Computer icon and select Properties, then select the Advanced tab and then Environment Variables.

      For Windows Vista or 7, right-click the Computer icon and select Properties, then select Advanced System settings and then select Environment Variables.

      Add LM_LICENSE_FILE with the value port#@hostname, reflecting the data given you by your system administrator, such as 1650@server1.

      The software does not look for licensing variables in the registry, therefore you must set either LM_LICENSE_FILE or MGLS_LICENSE_FILE environment variable.
5. Reboot your PC.
6. Make sure the license server is running, then invoke ModelSim through the Windows Start menu.

Windows PC License Server

Use this setup if you are installing a Windows PC license server that checks out licenses to Windows or UNIX clients.

If you already have a FlexNet installation on the server, you need to install only the mgcld daemon and the license file.

1. If you received a hardware security key (dongle), install it on the parallel or USB port of your server. Skip this step if you licensed ModelSim to the server's Ethernet ID.
2. Install ModelSim from the CD or via a downloaded installation executable.
3. Once the software is done installing, you will be prompted to install a hardware security key driver. Choose **Yes** if you installed a security key in Step 1; choose **No** if you licensed ModelSim to the server's Ethernet ID.
4. After installation is complete, save the *license.dat* file to *<install_dir>\win32\license.dat*.

   Make sure there are no extra spaces or line breaks in the license file. It must exactly match the license you received by e-mail, including upper and lower case and any backslashes (\).
5. Verify the name of your server via the Windows Control Panel by selecting **System > Computer Name**.
6. Open the *license.dat* file and change the server name to the name of your server. Use a text editor like Notepad rather than a word processor. Word processors may add extra hidden formatting characters to the file and cause problems. Edit the DAEMON line to point to the full path for the mgcld.exe, for example:

   ```
   SERVER server1 123456789123 1717
   DAEMON mgcld C:\<install_dir>\win32\mgcld.exe
   ```
7. Set the LM_LICENSE_FILE environment variable with the port# and hostname.
   - For Windows XP, right-click the My Computer icon and select the Advanced tab and then Environment Variables.

     Add LM_LICENSE_FILE with a value of 1650@hostname, where hostname is the name of your server.

     The software does not look for licensing variables in the registry, therefore you must set either LM_LICENSE_FILE or MGLS_LICENSE_FILE environment variable.
8. Reboot the server.
9. Launch *lmtools.exe* from the *<install_dir>\win32* directory.
10. Choose the Config Services tab and add the pathnames for *lmgrd.exe, license.dat,* and *debug.log*. Typical entries might look like this:

    ```
    lmgrd.exe -- <install_dir>\win32\lmgrd.exe
    License file -- <install_dir>\win32\license.dat
    Debug log file -- <install_dir>\win32\debug.log
    ```

    Click **Save Setup** when you finish entering the pathnames.

11. Choose the Start/Stop/Reread tab and click **Start Server**.
12. To verify that the server started, choose the Config Services tab and click **View Log**. Look for two lines similar to the following:

```
14:31:00 (lmgrd) Starting vendor daemons ...
14:31:00 (lmgrd) Started mgcld (pid 1088)
```

    Close lmtools once the server is started.

Troubleshooting Windows PC Server Setup

The **Licensing Wizard** located in the ModelSim program group can help you solve ModelSim licensing problems. Run the wizard on a client machine to check the availability of the license from your PC server.

In addition to running the Licensing Wizard, try the following:

- Open a DOS window and go to the appropriate <*install_dir*>*win32* directory. Enter the command:

```
lmutil.exe lmdiag
```

  This allows you to verify each feature independently.

- From a DOS window, and the same *win32* directory, enter the following:

```
lmutil.exe lmstat -a
```

  This shows you all licenses that are available.

- Go to the *debug.log* inside the *win32* directory. This may provide other information about the source of the license server problems.
- Verify that FlexNet v11.10 was installed on the server. Launch *lmtools.exe* from the <*install_dir*>*win32* directory and select **Help > About**.

Increasing Process Space for the Windows OS

Your machine may be set up to allow an extra gigabyte of process space (up to a total of 3GB). This is controlled with the /3GB (Windows XP) or /userva (Windows Vista) boot switches. ModelSim executables are linked with the /LARGEADDRESSAWARE switch to allow the use of this extra process space.

Note

Do not use the GUI if you've set this boot switch on your machine. This is because the application will most likely exceed the process space limit when displaying many windows containing lots of data.

Uninstalling from a Windows Machine

To remove any or all products installed with the Mentor Graphics Install:

1. From the Start Menu, select **Start > Programs > Mentor Graphics > Mentor Uninstall > Uninstall Mentor Products**
2. Select from:
   - **Sort by Target —** Choose this sort option to list all targets you have installed to.
   - **Sort by Product —** Choose this sort option to list all installed products.
3. Select individual, multiple, or **Select All** products to be removed.
4. Click **Next** to proceed to the Confirm Removal Selection window.
5. Click **Remove**.

   The Install program will prompt you to remove itself after the last product is removed.
6. Click **Done**.

Linux and UNIX Installation Instructions

ModelSim uses the Mentor Graphics Install program for installation on Linux and UNIX platforms.

You will need to acquire, either from the CD or via download, the following files:

- Installer executable— (*install.<platform>*) the executable for the Mentor Graphics Install interface.

  You should acquire the Installer executable specific to the platform from which you will be performing the installation.
- Base install file — (*<productname>-base.mis*) contains the base functionality for all platforms.
- Documentation install file — (*<productname>-docs.mis*) contains the documentation for all UNIX and Linux platforms. Using this file you could install only the documentation, but on UNIX and Linux platforms only.
- Platform-specific install file — (*<productname>-<platform>.mis*) contains installation files specific to the target platform (the platform, to which you are installing).

  You will need to acquire a platform-specific install file for each target platform.
- gcc compiler install file — (*<productname>_gcc-<ver>-<platform>.mis*) contains gcc compilers specific to your target platform.

If you are using SystemC, you will need to acquire a gcc compiler install file for all target platforms.

A complete release contains the Mentor Graphics Install program, the base install file, the platform specific install file(s) for your machine type(s) and the documentation install file.

The Mentor Graphics Install program, the base install file, the documentation install file and all platform specific install files need to be downloaded to the same directory location.

To begin the installation process, execute the Mentor Graphics Install program (*install.*<*platform*>) specific to the platform of the machine you are using to perform the installation. Be sure to execute the Mentor Graphics Installer from the same directory as the original download location containing the .mis files.

Use the Mentor Graphics Install program interface to install the tool to the locations required. The Help button at the top of the window provides documentation for using the Install program.

At this point, the installed directory contains all the base files, the docs files and the platform specific executables. For SystemC, it should also contain gcc executables.

After installing the product you should set your PATH environment variable to find the ModelSim executables.

If you know that you will only be using a single environment, you can explicitly set the PATH environment variable to your specific VCO:

PATH = <install_dir>/<platform>/

where platform could be: linux, linux_x86_64. In this scenario, you do not need to set the MTI_VCO_MODE environment variable because you are explicitly specifying either the 32- or 64-bit executables.

It is also possible to have an invocation scheme that is more platform-independent, based on the state of the MTI_VCO_MODE environment variable:

PATH = <install_dir>/bin/

This allows ModelSim to automatically detect which VCO to use for the vsim, vcom, and other executables.

By default, it will choose the 32-bit executables. You can override this behavior by setting the MTI_VCO_MODE to 64, which instructs ModelSim to choose the 64-bit executables.

Create a Batch File for Automated Installation

To automate ModelSim installation, you save the settings that you enter when using the Mentor Graphics Install interface. You save these settings to a file, which you can then use as a batch file for installing ModelSim again in the same location.

1. Invoke the Mentor Graphics Install interface (wizard).
2. On the opening page, click Install Products.
3. On the License Agreement page, click Agree.
4. On the Source and Target page, click the Browse buttons to navigate to the source and target locations for the installation.
5. Click Next.
6. On the Product Selection page, select all products that you want to install.
7. Click Next.
8. On the Confirm Selections page, click Save.
9. In the Save dialog box, use the Save in and File Name fields to specify the location and name of a text file that contains your installation settings.
10. The next time you want to run the same installation, run the following in a command shell:

```
install.linux -batch <filename>
```

Stand-Alone UNIX Workstation

Use this setup if you are running ModelSim on a stand-alone UNIX workstation. ModelSim and the license server run on the same system.

1. After installation is complete, save the *license.dat* file into the *<install_path>/* directory.
2. Open the *license.dat* file and change the server name to the hostname of your workstation.
3. Start the license manager daemon with the following commands:

```
cd <install_path>/<platform>
START_SERVER
```

4. Set the LM_LICENSE_FILE environment variable to the hostname:

```
setenv LM_LICENSE_FILE 1650@hostname
```

5. Enter the following command at the shell prompt to start ModelSim:

```
vsim
```

UNIX Client (Obtains License From a Server)

Use this setup if you are installing on a UNIX system that will obtain a license from a UNIX or PC server.

1. Once installation is complete, check with your system administrator for the license server's hostname (the network machine name) and port number (1650 is the default port number).
2. Set the LM_LICENSE_FILE environment variable with the port# and hostname:

   ```
   setenv LM_LICENSE_FILE 1650@hostname
   ```

   where hostname is the name of the license server.
3. Make sure the license server is running, then enter the following command at the shell prompt to start ModelSim:

   ```
   vsim
   ```

UNIX License Server

Use this setup if you are installing a UNIX license server that will checkout licenses to clients.

If you already have a FlexNet installation on the server, you need only install the mgcld daemon and the license file (log into www.mentor.com/supportnet if this is your situation).

1. Run the Install file (*install.<platform>*) specific to the platform you are installing from to begin the installation process. This command displays the Mentor Graphics Install wizard shown in Figure 1-1 (refer to "Mentor Graphics Install").
   a. Click the icon next to Install Products to initiate the procedure for licensing and installation. This procedure allows you to specify your installation location.
   b. To display online help for the wizard, click the Help button at the top of the window.
2. After installation is complete, save the *license.dat* file into the <*install_dir*> directory.
3. Open the *license.dat* file and change the server name to the hostname of your server.
4. Start the license manager daemon with the following commands:

   ```
   cd <install_path>/<platform>
   START_SERVER
   ```

   where <platform> can be linux, linuxle, or linux_x86_64.
5. Set the LM_LICENSE_FILE environment variable with the port# and hostname:

   ```
   setenv LM_LICENSE_FILE 1650@hostname
   ```

   where hostname is the name of the license server.

Regenerating Your Design Libraries

When you upgrade between number versions for example, from 10.1 to 10.2, you must regenerate your design libraries. This is not true for letter versions for example, 10.1a to 10.d.

Regenerating Methods

Explicit Refresh

You can easily regenerate your design libraries with **-refresh**. You must use the **vcom** compiler with the **-refresh** option to update the VHDL design units in a library, and **vlog** with the **-refresh** option to update Verilog design units. By default, the work library is updated; use **-work <library>** to update a different library. For example, if you have a library named **mylib** that contains both VHDL and Verilog design units you would use both of these commands:

```
vcom -work mylib -refresh
vlog -work mylib -refresh
```

Rebuild Libraries Without Source Code

An important feature of **-refresh** is that it rebuilds the library image without using source code. This means that models delivered as compiled libraries without source code can be rebuilt for a specific release of ModelSim. In general, this works for moving forwards or backwards on a release. Moving backwards on a release may not work if the models used compiler switches or directives (Verilog only) that do not exist in the older release or if a bug was fixed that makes it impossible to do a “backwards” refresh.

Note

You **do not** need to regenerate the std, ieee, modelsim_lib, vital, and verilog libraries as these are provided with each release of ModelSim. However, if you have your own copies of these libraries, you will need to refresh them.

AutoRefreshing

ModelSim 10.2 library files can be used by any 10.2 simulator type with the help of AutoRefresh. AutoRefresh works during simulation loading to build the library files needed by the current simulator type.

AutoRefresh builds only the files needed by the loading simulation, and then only refreshes files for design units that have changed, leaving the rest of the library files untouched.

The Binary Details

AutoRefresh regenerates the binaries for PE/DE (.psm), SE (.asm), and SE/64-bit (.asm64) that are stored in the ModelSim libraries.

For example, if a module is changed and recompiled on PE/DE, the next time an SE simulator tries to use that library, ModelSim automatically regenerates the necessary .asm files.

One library can contain the code for both formats. For example, for each design unit in a "work" library, there can be an SE and PE/DE version co-existing. In fact if you run a PE/DE-compiled design on SE, it will auto-refresh itself when you invoke **vsim**. The library format that SE needs is generated "on the fly" from the PE/DE format. After that point, both formats exist in the library and no more format conversion will occur.

Why two different formats? The SE compiler has several performance optimizations that aren't in the PE/DE compiler. Consequently, the generated code for SE has to be different.

Library Compatibility Between Versions

Libraries are compatible between different letter versions of the tool as long as the version number is the same. For example, 10.2 libraries are compatible with 10.2a, but not 10.1d.

Library Notes

Pre-compiled versions of some non-standard libraries and packages are no longer provided. The ARITHMETIC library, which contained a package for doing signed and unsigned vector arithmetic, is no longer included.

The packages NUMERIC_EXTRA, NUMERIC_SIGNED, NUMERIC_UNSIGNED, and STD_LOGIC_1164_EXTENSIONS, all from the IEEE library, are no longer included.

Technical Support

Visit the following web sites for support, software updates, and many other information sources.

Support

Mentor Graphics support:

`supportnet.mentor.com/`

FlexNet Licenses

ModelSim uses Flexera Software's FlexNet license manager and files. Flexera Software FlexNet license files contain lines that can be referred to by the word that appears first on the line. Each kind of line has a specific purpose and there are many more kinds of lines that MTI does not use.

This version of ModelSim uses version v11.10 of FlexNet. Sites that have existing license servers running an older version must shut down the servers and restart them using the license server (lmgrd) and vendor daemon (mgcld) provided in this release.

License Transfers and Server Changes

There is a charge for server changes or license transfers. For details, please contact your local Mentor Graphics sales office.

License Server Versions

The following table lists the FlexNet version that should be used with each version of ModelSim. Using an outdated version of the Flex*lm* software may produce errors.

Table 1-5. License Server Versions Supported for ModelSim

ModelSim Release Number	FlexNet Version
10.2	FlexNet v11.10
10.0 - 10.1	FLEXnet v11.6.1
6.6 - 6.6g 6.5 - 6.5g 6.4 - 6.4g	FLEXnet 10.8.5
6.3 - 6.3j 6.2 - 6.2k 6.1h	FLEXnet 10.8
6.1 - 6.1g	FLEXlm 9.5
6.0 - 6.0e	FLEXlm 8.2
5.8b - 5.8e	FLEXlm 8.2

Where to Obtain Your License

See http://supportnet.mentor.com/licenses for details.

Troubleshooting Common Licensing Problems

- What licenses are needed for mixed language simulation?

  To simulate a mixed language design, two licenses are required. The msimhdlmix and msimhdlsim licenses together or TWO msimhdlsim licenses will allow mixed language simulation. With just one msimhdlsim license, only one language at a time can be used.

- What can I do if get an error message that states that the encryption code has been modified?

  The most likely causes and solutions for this error are the following:

  - Extra space characters at the end of the line: Remove these characters.
  - Invalid characters added to the end of the line: Remove these characters.
  - Incorrect split in the line: Rejoin the lines.

  Solution: If the original version of the license file is available (in an e-mail archive or elsewhere), compare the modified license file to the original file.

  If extra SERVER lines were added, this also throws off the decryption of the license. You should remove those extra SERVER lines and restart the server. If you cannot remove the lines, contact your account manager to request a license file transfer.

Maintenance Renewals and Licenses

When maintenance is renewed, a new license file that incorporates the new maintenance expiration date will be sent to you automatically. If maintenance is not renewed, the current license file will still permit the use of software versions built before maintenance expired until the stop date is reached.

Exact Access Dates

This section lists the exact access date for each version of ModelSim released since v5.8b. Exact access dates are used to determine which released version of the product you can access. If the exact access date in your authcode is earlier than that of the product, then you will not be able to use that release.

Table 1-6. Exact Access Dates for ModelSim Releases

ModelSim Release	Exact Access Date (year.month)
10.2b	2013.05
10.2a	2013.03
10.2	2013.02
10.1e	2013.06
10.1d	2012.11
10.1c	2012.07
10.1b	2012.04
10.1a	2012.02

Table 1-6. Exact Access Dates for ModelSim Releases (cont.)

ModelSim Release	Exact Access Date (year.month)
10.1	2011.12
10.0f	2013.04
10.0e	2012.03
10.0d	2011.11
10.0c	2011.08
10.0b	2011.05
10.0a	2011.02
10.0	2010.12
6.6g	2012.05
6.6f	2011.09
6.6e	2011.04
6.6d	2010.11
6.6c	2010.08
6.6b	2010.05
6.6a	2010.03
6.6	2010.01
6.5g	2011.06
6.5f	2010.05
6.5e	2010.02
6.5d	2009.11
6.5c	2009.08
6.5b	2009.05
6.5a	2009.03
6.5	2008.07
6.4g	2010.07
6.4f	2009.10
6.4e	2009.06
6.4d	2009.03
6.4c	2008.12
6.4b	2008.11

Table 1-6. Exact Access Dates for ModelSim Releases (cont.)

ModelSim Release	Exact Access Date (year.month)
6.4a	2008.08
6.4	2008.06
6.3j	2008.10
6.3i	2008.09
6.3h	2008.07
6.3g	2008.04
6.3f	2008.03
6.3e	2008.02
6.3d	2007.11
6.3c	2007.09
6.3b	2007.08
6.3a	2007.06
6.3	2007.05
6.2k	2007.12
6.2j	2007.10
6.2i	2007.07
6.2h	2007.05
6.2g	2007.02
6.2f	2007.01
6.2e	2006.11
6.2d	2006.10
6.2c	2006.08
6.2b	2006.08
6.2a	2006.06
6.2	2006.04
6.1h	2007.05
6.1g	2006.08
6.1f	2006.05
6.1e	2006.03
6.1d	2006.01

Table 1-6. Exact Access Dates for ModelSim Releases (cont.)

ModelSim Release	Exact Access Date (year.month)
6.1c	2005.11
6.1b	2005.09
6.1a	2005.07
6.1	2005.06
6.0e	2005.06
6.0d	2005.03
6.0c	2005.02
6.0b	2004.11
6.0a	2004.09
5.8e	2004.09
6.0	2004.07
5.8d	2004.06
5.8c	2004.03
5.8b	2004.01

License File Examples

A node-locked *license.dat* file for FLEXid keys:

```
INCREMENT qhsimvh mgcld 2007.220 12-dec-2007 0 BD8652099FD3BC2ACF0D
VENDOR_STRING=520BC0CA HOSTID=FLEXID=9-542226d9 SN=7188197 SIGN2="1A00
B1E7 4D54 9232 BC8E D685 6FCD 3B8D 5E00 BBE8 AF51 BB4A 59C4 7551 AACA
0B41 8048 87DD CB3B A72E B1A3 36F6 FE9C 096C 51F3 6BA4 6C01 8E19 765A
F9FB"
INCREMENT qhsimvl mgcld 2007.220 12-dec-2007 0 3D968239F07091363556
VENDOR_STRING=E9EF2145 HOSTID=FLEXID=9-542226d9 SN=7188196 SIGN2="07D1
C7CE 2E0B 0639 AAF5 9A1A 3C8C 542D 298F D2A6 13D3 7FB0 8C26 6D31 B906
1A92 1CE4 83F8 2178 DC4A 7D31 184C 8439 3E3A 8337 BCB5 273A B0D2 4C2A
DA3E"
```

A floating *license.dat* file:

```
SERVER server1 00065B4213F2 1717
DAEMON mgcld C:\Modeltech_6.3\win32\mgcld.exe
INCREMENT qhsimvh mgcld 2007.220 4-dec-2007 1 DD35265192B8C3224364
VENDOR_STRING=66E0B055 SN=6264745 SIGN2="1688 0801 FAEC 27CE A6AD 0C2D
F9DB C37D 1E9C 7B5A F483 67BE 4F11 2C0C B7FC 135B 50AE 6C20 BE1E A991 2BCC
51BB 756D E2D5 CFB7 C801 FCE7 68F4 A24A A499"
INCREMENT qhsimvlog mgcld 2007.220 4-dec-2007 1 8D05E6017C8E0DE044AB
VENDOR_STRING=1AF05984 SN=6264744 SIGN2="071F 2C8E F935 C771 9C0A 763A
CE62 9424 9B00 6810 7C5A E8C5 3BD3 0DF7 9E04 1511 233E 9A52 B8B0 FD65 CFCB
8B30 1384 CF3D 8323 444F 51F0 F6EE 177B 79DC"
```

An Flexera Software FlexNet floating license file contains information about the license SERVER, the DAEMON required to authorize the feature, and a line for each product FEATURE you are authorized to execute.

The SERVER Line

The first line is a SERVER line; it spells out which computer on the network is the license server. The license server is a network resource that will manage the features for all users of ModelSim products. The SERVER line includes the server's hostname (the server's network identification - for Windows, check the Network properties Identification tab), hostID (a unique serial number), and a port number. The hostname and port number may be changed in a license file, but any change to the hostID will invalidate the license. If the host is a Windows machine, the hostID is the FLEXid security key number or the machine's Ethernet ID. The possible security key numbers include: 6-xxxxxxxx or 7-xxxxxxxx for Sentinel keys; 8-xxxxxxxx for Dallas keys; 9-xxxxxxxx for Aladdin USB keys.

Note

Dallas key IDs (8-xxxxxxxx) must be upper case. Aladdin USB key IDs (9-xxxxxxxx) must be lower case.

See Licensing for information on how to locate a server or key ID.

The DAEMON Line

A DAEMON line specifies the name of the license daemon and the locations of the daemon and options files it will use. This is the full path to the mgcld daemon. In the example file, the UNIX "./" means "look in the current directory". This is the directory in which the server was started. If the server is to be started from another directory, the full path to the *mgcld* and *options* files would need to be added to this line.

For example,

```
DAEMON mgcld /usr/mti10.1/linux/mgcld \
/usr/mti10.1/linux/options
```

Note

The "options" line is only necessary if you are using a FlexNet options file.

The INCREMENT Line

An INCREMENT line describes how many licenses ("tokens") are available; it contains the feature name, daemon required, most current build date authorized to run, token expiration date, number of tokens for the feature, license code, and a checksum.

If an INCREMENT entry is too long to fit on a single line, a backslash (\) appears at the end of the line. A UNIX system interprets that as joining the next line with the current line (that is, treating both lines as one, without a linefeed or carriage return). Therefore, never delete a backslash at the end of a line when you are transcribing a license file. Similarly, do not insert another character after a backslash.

License Feature Names

The names on the feature lines in the license file correspond to particular functions in the ModelSim and Questa products.

Table 1-7. Feature Names

Feature name	Description	ModelSim			Questa			
X = Standard O = Option		**PE**	**DE**	**SE**	**SV**	**AFV**	**Core**	**Prime**
msimcdebug	Enables C debugging.		O	X	X	X	X	X
msimdataflow	Enables Dataflow and Schematic Window	X	X	X	X	X	X	X
msimhdlmix	Second license for mixed simulation, regardless of language			X		X	X	X
msimhdlsim	Language Neutral License (LNL) simulation; can act as either VHDL or Verilog			X		X	X	X
msimpevsim	PE VHDL simulator	X	X					
msimpevsimvlog	PE Verilog simulator	X	X					
msimsystemcnl	Enables SystemC simulation (node-lock)	O	O					
msimsystemc	Enables SystemC simulation	O	O	O		X	O	X
qhsimvh	Enables VHDL simulation			X			X	
qhsimvl	Enables Verilog simulation			X	X		X	
msimcompare	Enables simulation results comparison; waveform compare.	X	X	X	X	X	X	X
msimcoverage	Enables code coverage	X	X	X	X	X	X	X
msimprofile	Enables code profiling	O	O	X	X	X	X	X
msimviewer	Enables the GUI	O	X	X	X	X	X	X
peproassertions	Enables SystemVerilog and PSL assertions		X					
txanalysis	Enables transaction viewing			O	X	X	O	X

Table 1-7. Feature Names (cont.)

Feature name	Description	ModelSim			Questa			
X = Standard O = Option		**PE**	**DE**	**SE**	**SV**	**AFV**	**Core**	**Prime**
mtiverification	Enables PSL and SystemVerilog assertions			O	X	X	X	X
svverification	Enables functional coverage, constrained random stimulus generation, and Program Blocks			O	X	X		X
qpasim	Enables Power Aware verification			O	X	X		
zncwmbase	Enables checker and monitor functionality			O	X	X		X
qvrm	Enables the Verification Run Manager				X	X		X
qvman	Enables the Verification Management features (including triage report, vcover report -trend, vcover report -html, Testplan analysis)				X	X		X
mc2sim[1]	Enables multi-core, multi-processor simulation				O	O	O	O
msimreguvm	Enables the Register Assistant UVM tool.				X	X		X

1. Linux platform only.

Finding License Features for Your Site

A list of features for your site is available on the SupportNet web site at the following URL:

http://supportnet.mentor.com/licenses

This displays the Licensing tab of your “My Account” page.

- To find your current license file, click the link for “Authorization codes.”
- To view the license feature by product, click the link for “License reports” and generate the report.

Mentor Graphics Install

The following is a quick reference resource on how to install Mentor Graphics software using the Mentor Graphics Install program.

1. Order software licenses from Mentor Graphics.

Note

To fully enable automatic product selection by licenses, set up your software licensing environment before running the Install program. Refer to the *Licensing Mentor Graphics Software* manual.

2. If you have previously installed the Install program, change directory (cd) to the directory containing the Install program and run it. If this is your first time installing Mentor Graphics products, begin by installing the Install program.

   a. Mount the CD-ROM.

   b. From the top level of the CD-ROM, invoke install.<*platform*>.

   Either method displays the Mentor Install wizard shown in Figure 1-1.

Figure 1-1. Installation Wizard (First Screen)

Tip: After the Mentor Graphics Install program displays the wizard, instructions for performing each of the following tasks are available in the online help.

3. Click the icon next to Install Products on the first screen.

4. Read the Mentor Graphics Licensing Agreement and click Agree to accept.
5. In the Source and Target screen, select the source and target for your installation and click Next.
6. In the Releases window, select the releases to install and click Next.
7. In the Product Selection window, select the products to install and platform and click Next.
8. In the Confirm Selections window, confirm your product selections and click Install.

Troubleshooting Common Errors

Table 1-8 lists some of the more common errors encountered during installation.

Table 1-8. Troubleshooting Common Errors

Error #	Problem	Result	Solution
CP0008	The current version of the Install program on your system is out of date. There is a newer version of the Install program available on the latest installation media.	You must update your version of the Mentor Graphics Install program from the latest installation media.	Exit the Mentor Graphics Install program and refer to either the web-based "Installation Instructions" on the SupportNet download web page, or the CD booklet available with all installation media.
CP00030	The Mentor Graphics Install program encountered an error while trying to read the startup data.	The Install program will not proceed further.	The installData.xml.gz file needs to be in the Mentor Graphics Install data directory. On UNIX this file name is case sensitive.
IPW112	An error occurred when the Install program tried to open a script archive file.	The Installation script archive could not be found, therefore the Install program will not proceed.	If you are installing source from CD-ROM, make sure the Volume 1 CD-ROM is available and click **Retry**. Selecting **Cancel** will cancel the installation.
IPW113	An error occurred when the Install program tried to open a script archive file.	The Installation script archive could not be found, therefore, the Install program will not proceed.	If you are installing source from CD-ROM, make sure the Volume 1 CD-ROM is available and click **Retry**. Selecting **Cancel** will cancel the installation.

Table 1-8. Troubleshooting Common Errors (cont.)

Error #	Problem	Result	Solution
IPW114	A file write error occurred.	The Install program cannot write to the specified file.	The file (or directory the file is in) may not have Write permissions. Verify that permissions are open on the file/directory and select **Retry** to continue the installation. Selecting **Cancel** will cancel the installation.
IPW116	An error occurred while attempting to write to a file.	The Install program could not write to the specified file and installation is being cancelled.	Verify the path to the file. If the path was correct, contact Customer Support and provide them with the Details and Error #IPW116.
IPW118	An error occurred while attempting to write to a file.	The Install program could not write to the specified file and installation is being cancelled.	Verify the path to the file. If the path was correct, contact Customer Support and provide them with the Details and Error #IPW118.
IPW122	A file write error occurred.	The Install program cannot write to the specified file.	The file (or directory the file is in) may not have write permissions. Verify that permissions are open on the file/directory and select **Retry** to continue the installation. Selecting **Cancel** will cancel the installation.
IPW123	A file read error occurred.	The Install program cannot read the specified file.	The file (or directory the file is in) may not Read permissions. Verify that permissions are open on the file/directory and select **Retry** to continue the installation. Selecting **Cancel** will cancel the installation.

Troubleshooting Common Problems

Table 1-9 shows some frequently encountered problems, with their possible causes and solutions. For additional help, consult applicable vendor manuals or contact the Mentor Graphics SupportCenter.

Table 1-9. Troubleshooting Common Problems

Problem	Possible Cause	Solution
"Can't open display" or similar message received on attempt to execute first remote client.	No value set for the DISPLAY environment variable.	Set the DISPLAY environment variable. In a Bourne or Korn shell, type: $DISPLAY= <your_X_display_name>:0.0 $export DISPLAY
	DISPLAY environment variable lacking ":0"	Reset the DISPLAY environment variable so it includes the ":0" syntax.
	Display machine not permitting access.	Open a new command window on the display machine and run the **xhost +** command. Refer to the xhost(1) manual page for workstations and the vendors documentation for terminals and PCs.
	X display's name not known to X host.	Add name to host database.
During Product Removal, Product or Release is not visible in the Install program.	May not be pointing at the appropriate Target location.	Verify that correct Target location has been indicated on Product Removal Selection window.
Unable to click in a checkbox.	The sensitivity setting for your mouse is set incorrectly for this Java application.	Decrease the sensitivity of your mouse (so the mouse moves slower) in your Control Panel. Refer to technote mg48980 in SupportNet.

Table 1-9. Troubleshooting Common Problems (cont.)

Problem	Possible Cause	Solution
Unable to uninstall the Mentor Graphics Install program.		Navigate to the directory where Install.exe is located. 1. Open the *bin* directory and double-click on **Uninstall.exe**. This does not fully remove all of the Mentor Graphics Install program, but it does remove the registry entries so that the install program can be re-installed. 2. Delete the *install* directory. This removes all targets.

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End-User License Agreement

The latest version of the End-User License Agreement is available on-line at:
www.mentor.com/eula

IMPORTANT INFORMATION

USE OF ALL SOFTWARE IS SUBJECT TO LICENSE RESTRICTIONS. CAREFULLY READ THIS LICENSE AGREEMENT BEFORE USING THE PRODUCTS. USE OF SOFTWARE INDICATES CUSTOMER'S COMPLETE AND UNCONDITIONAL ACCEPTANCE OF THE TERMS AND CONDITIONS SET FORTH IN THIS AGREEMENT. ANY ADDITIONAL OR DIFFERENT PURCHASE ORDER TERMS AND CONDITIONS SHALL NOT APPLY.

END-USER LICENSE AGREEMENT ("Agreement")

This is a legal agreement concerning the use of Software (as defined in Section 2) and hardware (collectively "Products") between the company acquiring the Products ("Customer"), and the Mentor Graphics entity that issued the corresponding quotation or, if no quotation was issued, the applicable local Mentor Graphics entity ("Mentor Graphics"). Except for license agreements related to the subject matter of this license agreement which are physically signed by Customer and an authorized representative of Mentor Graphics, this Agreement and the applicable quotation contain the parties' entire understanding relating to the subject matter and supersede all prior or contemporaneous agreements. If Customer does not agree to these terms and conditions, promptly return or, in the case of Software received electronically, certify destruction of Software and all accompanying items within five days after receipt of Software and receive a full refund of any license fee paid.

1. **ORDERS, FEES AND PAYMENT.**

   1.1. To the extent Customer (or if agreed by Mentor Graphics, Customer's appointed third party buying agent) places and Mentor Graphics accepts purchase orders pursuant to this Agreement ("Order(s)"), each Order will constitute a contract between Customer and Mentor Graphics, which shall be governed solely and exclusively by the terms and conditions of this Agreement, any applicable addenda and the applicable quotation, whether or not these documents are referenced on the Order. Any additional or conflicting terms and conditions appearing on an Order or presented via any electronic portal or other automated order management system will not be effective unless agreed in writing by an authorized representative of Customer and Mentor Graphics.

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   1.3. All Products are delivered FCA factory (Incoterms 2010), freight prepaid and invoiced to Customer, except Software delivered electronically, which shall be deemed delivered when made available to Customer for download. Mentor Graphics retains a security interest in all Products delivered under this Agreement, to secure payment of the purchase price of such Products, and Customer agrees to sign any documents that Mentor Graphics determines to be necessary or convenient for use in filing or perfecting such security interest. Mentor Graphics' delivery of Software by electronic means is subject to Customer's provision of both a primary and an alternate e-mail address.

2. **GRANT OF LICENSE.** The software installed, downloaded, or otherwise acquired by Customer under this Agreement, including any updates, modifications, revisions, copies, documentation and design data ("Software") are copyrighted, trade secret and confidential information of Mentor Graphics or its licensors, who maintain exclusive title to all Software and retain all rights not expressly granted by this Agreement. Mentor Graphics grants to Customer, subject to payment of applicable license fees, a nontransferable, nonexclusive license to use Software solely: (a) in machine-readable, object-code form (except as provided in Subsection 5.2); (b) for Customer's internal business purposes; (c) for the term of the license; and (d) on the computer hardware and at the site authorized by Mentor Graphics. A site is restricted to a one-half mile (800 meter) radius. Customer may have Software temporarily used by an employee for telecommuting purposes from locations other than a Customer office, such as the employee's residence, an airport or hotel, provided that such employee's primary place of employment is the site where the Software is authorized for use. Mentor Graphics' standard policies and programs, which vary depending on Software, license fees paid or services purchased, apply to the following: (a) relocation of Software; (b) use of Software, which may be limited, for example, to execution of a single session by a single user on the authorized hardware or for a restricted period of time (such limitations may be technically implemented through the use of authorization codes or similar devices); and (c) support services provided, including eligibility to receive telephone support, updates, modifications, and revisions. For the avoidance of doubt, if Customer provides any feedback or requests any change or enhancement to Products,

whether in the course of receiving support or consulting services, evaluating Products, performing beta testing or otherwise, any inventions, product improvements, modifications or developments made by Mentor Graphics (at Mentor Graphics' sole discretion) will be the exclusive property of Mentor Graphics.

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4.2. If Mentor Graphics authorizes Customer to use the Beta Code, Customer agrees to evaluate and test the Beta Code under normal conditions as directed by Mentor Graphics. Customer will contact Mentor Graphics periodically during Customer's use of the Beta Code to discuss any malfunctions or suggested improvements. Upon completion of Customer's evaluation and testing, Customer will send to Mentor Graphics a written evaluation of the Beta Code, including its strengths, weaknesses and recommended improvements.

4.3. Customer agrees to maintain Beta Code in confidence and shall restrict access to the Beta Code, including the methods and concepts utilized therein, solely to those employees and Customer location(s) authorized by Mentor Graphics to perform beta testing. Customer agrees that any written evaluations and all inventions, product improvements, modifications or developments that Mentor Graphics conceived or made during or subsequent to this Agreement, including those based partly or wholly on Customer's feedback, will be the exclusive property of Mentor Graphics. Mentor Graphics will have exclusive rights, title and interest in all such property. The provisions of this Subsection 4.3 shall survive termination of this Agreement.

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5.1. Customer may copy Software only as reasonably necessary to support the authorized use. Each copy must include all notices and legends embedded in Software and affixed to its medium and container as received from Mentor Graphics. All copies shall remain the property of Mentor Graphics or its licensors. Customer shall maintain a record of the number and primary location of all copies of Software, including copies merged with other software, and shall make those records available to Mentor Graphics upon request. Customer shall not make Products available in any form to any person other than Customer's employees and on-site contractors, excluding Mentor Graphics competitors, whose job performance requires access and who are under obligations of confidentiality. Customer shall take appropriate action to protect the confidentiality of Products and ensure that any person permitted access does not disclose or use Products except as permitted by this Agreement. Customer shall give Mentor Graphics written notice of any unauthorized disclosure or use of the Products as soon as Customer becomes aware of such unauthorized disclosure or use. Except as otherwise permitted for purposes of interoperability as specified by applicable and mandatory local law, Customer shall not reverse-assemble, reverse-compile, reverse-engineer or in any way derive any source code from Software. Log files, data files, rule files and script files generated by or for the Software (collectively "Files"), including without limitation files containing Standard Verification Rule Format ("SVRF") and Tcl Verification Format ("TVF") which are Mentor Graphics' proprietary syntaxes for expressing process rules, constitute or include confidential information of Mentor Graphics. Customer may share Files with third parties, excluding Mentor Graphics competitors, provided that the confidentiality of such Files is protected by written agreement at least as well as Customer protects other information of a similar nature or importance, but in any case with at least reasonable care. Customer may use Files containing SVRF or TVF only with Mentor Graphics products. Under no circumstances shall Customer use Software or Files or allow their use for the purpose of developing, enhancing or marketing any product that is in any way competitive with Software, or disclose to any third party the results of, or information pertaining to, any benchmark.

5.2. If any Software or portions thereof are provided in source code form, Customer will use the source code only to correct software errors and enhance or modify the Software for the authorized use. Customer shall not disclose or permit disclosure of source code, in whole or in part, including any of its methods or concepts, to anyone except Customer's employees or on-site contractors, excluding Mentor Graphics competitors, with a need to know. Customer shall not copy or compile source code in any manner except to support this authorized use.

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of this Agreement, including without limitation the licensing and assignment provisions, shall be binding upon Customer's permitted successors in interest and assigns.

5.4. The provisions of this Section 5 shall survive the termination of this Agreement.

6. **SUPPORT SERVICES.** To the extent Customer purchases support services, Mentor Graphics will provide Customer with updates and technical support for the Products, at the Customer site(s) for which support is purchased, in accordance with Mentor Graphics' then current End-User Support Terms located at http://supportnet.mentor.com/about/legal/.

7. **LIMITED WARRANTY.**

7.1. Mentor Graphics warrants that during the warranty period its standard, generally supported Products, when properly installed, will substantially conform to the functional specifications set forth in the applicable user manual. Mentor Graphics does not warrant that Products will meet Customer's requirements or that operation of Products will be uninterrupted or error free. The warranty period is 90 days starting on the 15th day after delivery or upon installation, whichever first occurs. Customer must notify Mentor Graphics in writing of any nonconformity within the warranty period. For the avoidance of doubt, this warranty applies only to the initial shipment of Software under an Order and does not renew or reset, for example, with the delivery of (a) Software updates or (b) authorization codes or alternate Software under a transaction involving Software re-mix. This warranty shall not be valid if Products have been subject to misuse, unauthorized modification, improper installation or Customer is not in compliance with this Agreement. MENTOR GRAPHICS' ENTIRE LIABILITY AND CUSTOMER'S EXCLUSIVE REMEDY SHALL BE, AT MENTOR GRAPHICS' OPTION, EITHER (A) REFUND OF THE PRICE PAID UPON RETURN OF THE PRODUCTS TO MENTOR GRAPHICS OR (B) MODIFICATION OR REPLACEMENT OF THE PRODUCTS THAT DO NOT MEET THIS LIMITED WARRANTY. MENTOR GRAPHICS MAKES NO WARRANTIES WITH RESPECT TO: (A) SERVICES; (B) PRODUCTS PROVIDED AT NO CHARGE; OR (C) BETA CODE; ALL OF WHICH ARE PROVIDED "AS IS."

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9. **HAZARDOUS APPLICATIONS.** CUSTOMER ACKNOWLEDGES IT IS SOLELY RESPONSIBLE FOR TESTING ITS PRODUCTS USED IN APPLICATIONS WHERE THE FAILURE OR INACCURACY OF ITS PRODUCTS MIGHT RESULT IN DEATH OR PERSONAL INJURY ("HAZARDOUS APPLICATIONS"). EXCEPT TO THE EXTENT THIS EXCLUSION OR RESTRICTION OF LIABILITY WOULD BE VOID OR INEFFECTIVE UNDER APPLICABLE LAW, IN NO EVENT SHALL MENTOR GRAPHICS OR ITS LICENSORS BE LIABLE FOR ANY DAMAGES RESULTING FROM OR IN CONNECTION WITH THE USE OF MENTOR GRAPHICS PRODUCTS IN OR FOR HAZARDOUS APPLICATIONS. THE PROVISIONS OF THIS SECTION 9 SHALL SURVIVE THE TERMINATION OF THIS AGREEMENT.

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11. **INFRINGEMENT.**

11.1. Mentor Graphics will defend or settle, at its option and expense, any action brought against Customer in the United States, Canada, Japan, or member state of the European Union which alleges that any standard, generally supported Product acquired by Customer hereunder infringes a patent or copyright or misappropriates a trade secret in such jurisdiction. Mentor Graphics will pay costs and damages finally awarded against Customer that are attributable to such action. Customer understands and agrees that as conditions to Mentor Graphics' obligations under this section Customer must: (a) notify Mentor Graphics promptly in writing of the action; (b) provide Mentor Graphics all reasonable information and assistance to settle or defend the action; and (c) grant Mentor Graphics sole authority and control of the defense or settlement of the action.

11.2. If a claim is made under Subsection 11.1 Mentor Graphics may, at its option and expense: (a) replace or modify the Product so that it becomes noninfringing; (b) procure for Customer the right to continue using the Product; or (c) require the return of the Product and refund to Customer any purchase price or license fee paid, less a reasonable allowance for use.

11.3. Mentor Graphics has no liability to Customer if the action is based upon: (a) the combination of Software or hardware with any product not furnished by Mentor Graphics; (b) the modification of the Product other than by Mentor Graphics; (c) the use of other than a current unaltered release of Software; (d) the use of the Product as part of an infringing process; (e) a product that Customer makes, uses, or sells; (f) any Beta Code or Product provided at no charge; (g) any software provided by Mentor Graphics' licensors who do not provide such indemnification to Mentor Graphics' customers; or (h) infringement by Customer that is deemed willful. In the case of (h), Customer shall reimburse Mentor Graphics for its reasonable attorney fees and other costs related to the action.

11.4. THIS SECTION 11 IS SUBJECT TO SECTION 8 ABOVE AND STATES THE ENTIRE LIABILITY OF MENTOR GRAPHICS AND ITS LICENSORS, AND CUSTOMER'S SOLE AND EXCLUSIVE REMEDY, FOR DEFENSE, SETTLEMENT AND DAMAGES, WITH RESPECT TO ANY ALLEGED PATENT OR COPYRIGHT INFRINGEMENT OR TRADE SECRET MISAPPROPRIATION BY ANY PRODUCT PROVIDED UNDER THIS AGREEMENT.

12. **TERMINATION AND EFFECT OF TERMINATION.**

12.1. If a Software license was provided for limited term use, such license will automatically terminate at the end of the authorized term. Mentor Graphics may terminate this Agreement and/or any license granted under this Agreement immediately upon written notice if Customer: (a) exceeds the scope of the license or otherwise fails to comply with the licensing or confidentiality provisions of this Agreement, or (b) becomes insolvent, files a bankruptcy petition, institutes proceedings for liquidation or winding up or enters into an agreement to assign its assets for the benefit of creditors. For any other material breach of any provision of this Agreement, Mentor Graphics may terminate this Agreement and/or any license granted under this Agreement upon 30 days written notice if Customer fails to cure the breach within the 30 day notice period. Termination of this Agreement or any license granted hereunder will not affect Customer's obligation to pay for Products shipped or licenses granted prior to the termination, which amounts shall be payable immediately upon the date of termination.

12.2. Upon termination of this Agreement, the rights and obligations of the parties shall cease except as expressly set forth in this Agreement. Upon termination, Customer shall ensure that all use of the affected Products ceases, and shall return hardware and either return to Mentor Graphics or destroy Software in Customer's possession, including all copies and documentation, and certify in writing to Mentor Graphics within ten business days of the termination date that Customer no longer possesses any of the affected Products or copies of Software in any form.

13. **EXPORT.** The Products provided hereunder are subject to regulation by local laws and United States ("U.S.") government agencies, which prohibit export, re-export or diversion of certain products, information about the products, and direct or indirect products thereof, to certain countries and certain persons. Customer agrees that it will not export or re-export Products in any manner without first obtaining all necessary approval from appropriate local and U.S. government agencies. If Customer wishes to disclose any information to Mentor Graphics that is subject to any U.S. or other applicable export restrictions, including without limitation the U.S. International Traffic in Arms Regulations (ITAR) or special controls under the Export Administration Regulations (EAR), Customer will notify Mentor Graphics personnel, in advance of each instance of disclosure, that such information is subject to such export restrictions.

14. **U.S. GOVERNMENT LICENSE RIGHTS.** Software was developed entirely at private expense. The parties agree that all Software is commercial computer software within the meaning of the applicable acquisition regulations. Accordingly, pursuant to U.S. FAR 48 CFR 12.212 and DFAR 48 CFR 227.7202, use, duplication and disclosure of the Software by or for the U.S. government or a U.S. government subcontractor is subject solely to the terms and conditions set forth in this Agreement, which shall supersede any conflicting terms or conditions in any government order document, except for provisions which are contrary to applicable mandatory federal laws.

15. **THIRD PARTY BENEFICIARY.** Mentor Graphics Corporation, Mentor Graphics (Ireland) Limited, Microsoft Corporation and other licensors may be third party beneficiaries of this Agreement with the right to enforce the obligations set forth herein.

16. **REVIEW OF LICENSE USAGE.** Customer will monitor the access to and use of Software. With prior written notice and during Customer's normal business hours, Mentor Graphics may engage an internationally recognized accounting firm to review Customer's software monitoring system and records deemed relevant by the internationally recognized accounting firm to confirm Customer's compliance with the terms of this Agreement or U.S. or other local export laws. Such review may include FlexNet (or successor product) report log files that Customer shall capture and provide at Mentor Graphics' request. Customer shall make records available in electronic format and shall fully cooperate with data gathering to support the license review. Mentor Graphics shall bear the expense of any such review unless a material non-compliance is revealed. Mentor Graphics shall treat as confidential information all information gained as a result of any request or review and shall only use or disclose such information as required by law or to enforce its rights under this Agreement. The provisions of this Section 16 shall survive the termination of this Agreement.

17. **CONTROLLING LAW, JURISDICTION AND DISPUTE RESOLUTION.** The owners of certain Mentor Graphics intellectual property licensed under this Agreement are located in Ireland and the U.S. To promote consistency around the world, disputes shall be resolved as follows: excluding conflict of laws rules, this Agreement shall be governed by and construed under the laws of the State of Oregon, U.S., if Customer is located in North or South America, and the laws of Ireland if

Customer is located outside of North or South America. All disputes arising out of or in relation to this Agreement shall be submitted to the exclusive jurisdiction of the courts of Portland, Oregon when the laws of Oregon apply, or Dublin, Ireland when the laws of Ireland apply. Notwithstanding the foregoing, all disputes in Asia arising out of or in relation to this Agreement shall be resolved by arbitration in Singapore before a single arbitrator to be appointed by the chairman of the Singapore International Arbitration Centre ("SIAC") to be conducted in the English language, in accordance with the Arbitration Rules of the SIAC in effect at the time of the dispute, which rules are deemed to be incorporated by reference in this section. Nothing in this section shall restrict Mentor Graphics' right to bring an action (including for example a motion for injunctive relief) against Customer in the jurisdiction where Customer's place of business is located. The United Nations Convention on Contracts for the International Sale of Goods does not apply to this Agreement.

18. **SEVERABILITY.** If any provision of this Agreement is held by a court of competent jurisdiction to be void, invalid, unenforceable or illegal, such provision shall be severed from this Agreement and the remaining provisions will remain in full force and effect.

19. **MISCELLANEOUS.** This Agreement contains the parties' entire understanding relating to its subject matter and supersedes all prior or contemporaneous agreements. Some Software may contain code distributed under a third party license agreement that may provide additional rights to Customer. Please see the applicable Software documentation for details. This Agreement may only be modified in writing, signed by an authorized representative of each party. Waiver of terms or excuse of breach must be in writing and shall not constitute subsequent consent, waiver or excuse.

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